Ontario

Apprenticeship
In-school Curriculum Standards

Railway Car Technician

Level 1 Basic

268R

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Implementation date: September 2008
Printing date: September 2008

ISBN 978-1-4249-7938-7 (Print)
ISBN 978-1-4249-7939-4 (PDF)

Printed on recycled paper

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08-192

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Introduction

This curriculum revision for the Level 1 – Railway Car Technician is based upon the on-the-job performance objectives, located in the industry approved training standard.

The curriculum is organized into 8 reportable subjects. The Program Summary of Reportable Subjects chart summarizes the training hours for each reportable subject. The curriculum identifies only the learning that takes place off-the-job. The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the Apprenticeship Training Standards. Employers/Sponsors are expected to extend the apprentice's knowledge and skills through practical training on the work site. Regular evaluations of the apprentice's knowledge and skills are conducted throughout training to ensure that all apprentices have achieved the learning outcomes and content identified in the curriculum standard.

It is not the intent of the in-school curriculum to perfect on-the-job skills. The practical portion of the in-school program is used to reinforce theoretical knowledge. Skill training is provided on the job.

Program Summary of Reportable Subjects - Level 1

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical
S0446	Protect Self And Others	6	6	0
S0447	Occupational Practices	63	33	30
S0448	Workshop Techniques	63	24	39
S0449	Material Handling	18	12	6
S0450	Welding and Fabrication 1	33	9	24
S0451	Regulatory Publications 1	24	24	0
S0452	Rail Car Brakes 1	24	15	9
S0453	Rail Car Safety Appliances	9	9	0
	Total	**240**	**132**	**108**

Number: **S0446**

Title: **PROTECT SELF AND OTHERS**

Duration: Total 6 hours Theory 6 hours Practical 0 hours

Prerequisites: Grade 12

Content:

S0446.1 Identify workplace health and safety hazards, and describe corrective actions and reporting procedures **(1 hr)**
S0446.2 Describe safe working habits **(1 hr)**
S0446.3 Identify fire safety procedures **(1 hr)**
S0446.4 Describe reporting procedures for injuries and safety incidents **(1 hr)**
S0446.5 Describe basic first aid procedures **(1 hr)**
S0446.6 Describe procedures for handling work site safety hazards **(1 hr)**

Evaluation & Testing:
Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
100 %	0%	100%

Instructional/Delivery Strategies:
Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0446.0 Protect Self and Others

Duration: Total 6 hours Theory 6 hours Practical 0 hours

Cross Reference to Training Standards: U5570 > U5580

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to describe appropriate safe work practices.

LEARNING OUTCOMES AND CONTENT

46.1 Identify workplace health and safety hazards, describe corrective action and reporting procedures. **(1 hr)**

Describe the current government legislation and AAR regulations that relates to workplace hazards.

Identify hazardous conditions.

Describe the required reporting procedures.

Identify the required corrective action to be taken.

46.2 Describe safe working habits. **(1 hr)**

Describe safe work practices and procedures:
- current government regulations
- AAR regulations

46.3 Identify fire safety procedures. **(1 hr)**

Describe procedures to be taken when a fire is detected.

Describe procedures for assessing the severity of the fire.

Describe methods for suppressing a minor fire.

Describe reporting procedures.

46.4 Describe reporting procedures for injuries and safety incidents. **(1 hr)**

Describe the reporting procedures outlined in the current government legislation and AAR regulations.

46.5 Describe basic first aid procedures. **(1 hr)**

Identify situations for applying basic first aid.

Identify reporting procedures for further medical aid.

46.6 Describe procedures for handling work site safety hazards. **(1 hr)**

Identify workplace safety hazards:

- inadequate ventilation
- confined spaces
- noxious fumes
- high intensity light
- elevated work sites
- suspended loads
- poor lighting
- extreme temperatures
- uncontrolled power sources
- notification of hazards
- safety legislation
- AAR regulations

Number: **S0447**

Title: **OCCUPATIONAL PRACTICES**

Duration: Total 63 hours Theory 33 hours Practical 30 hours

Prerequisites: Grade 12

Content:

S0447.1 Perform SI and Imperial calculations **(15 hrs)**
S0447.2 Interpret engineering drawings and documentation **(33 hrs)**
S0447.3 Demonstrate measuring and checking procedures **(15 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
55 %	45%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0447.0 Occupational Practices

Duration: Total 63 hours Theory 33 hours Practical 30 hours

Cross Reference to Training Standards: U5571.01, U5571.02, U5571.03, U5571.05, U5571.04, U5571.06

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to interpret engineering drawings and documentation; perform trade-specific calculations, and perform precision measuring and checking procedures.

LEARNING OUTCOMES AND CONTENT

47.1 Perform SI and Imperial calculations. **(15 hrs)**

Interpret charts, manuals, and job documentation:
- trade-specific conversion tables/charts
- trade-specific material
- product-related specifications
- tables
- charts

Perform trade-specific calculations:
- ratios
- proportions
- algebraic equations
- perimeters
- areas
- volumes

Demonstrate conversions between SI and Imperial systems of measurements:
- linear units
- mass units
- charts
- tables

47.1 Continued

Perform conversions of decimals and fractions:

- round off decimals
- common fractions
- decimal fractions
- fractions
  - add
  - subtract
  - multiply
  - divide
- decimals
  - add
  - subtract
  - multiply
  - divide
- percentages

Perform conversions of metric and imperial units:

- volumes
- weights
- tolerances
- gauging limits
- condemning limits
- circumferences
- radii
- areas
- diameters
- temperatures
- torque values

Demonstrate conversions between SI and Imperial systems of measurements:

- linear units
- mass units
- charts
- tables

47.2 Interpret engineering drawings and job documentation. **(33 hrs)**

Interpret engineering drawings and job documentation:

- schematics
- blueprints
- assemblies
- tolerances
- scales
- dimensions
- calculations
- line types
- symbols
- title block information
- references
- abbreviations
- bill of material
- railway nomenclature/terminology
- components/parts
- securement devices
- assembly
- disassembly

Identify required documentation:

- work orders
- billing repair cards
- wheel reporting cards
- inspection records
- dangerous goods documentation
- manufacturers' manuals
- parts bulletins
- service/repair procedures
- preventative maintenance manuals
- technical bulletins
- fact sheets
- Association of American Railroads (AAR) field manuals
- government legislation
- assembly sequences
- disassembly sequences
- workpiece properties
- workpiece characteristics
- cutting fluids/lubricants properties
- cutting fluids/lubricants applications
- specialty tools

47.2 Continued

Interpret all documentation to identify:

- safety procedures
- AAR interchange rules
- government legislation
- dangerous goods handling procedures
- car billing repair codes
- work procedures
- job sequence
- hand tools
- power equipment and devices
- material handling requirements and equipment
- maintenance procedures
- repair methods
- replacement procedures
- inspection procedures
- workpiece material
- parts and components
- measuring and checking procedures
- verification process
- work reporting procedures

Verify workpiece material characteristics and type:

- safety legislation
- AAR regulations
- engineering drawings
- job documentation
- steel
- alloys
- aluminum
- iron
- type
- size
- hardness

47.3 Demonstrate measuring and checking procedures. **(15 hrs)**

Identify measuring and checking instruments and devices:

- micrometers
- calipers
- wheel gauge
- vernier calipers
- magnetic particle tester
- dial indicator
- truck gauges
- air pressure gauges
- bubble flowrator
- depth or height gauge
- restoration gauges
- levels
- explosive safety meters
- air quality meters
- thickness meters
- straight edge
- tapes
- steel rules
- plumb bob

Describe procedures for assessing condition of tools and equipment.

Describe the markings on measuring devices.

Demonstrate measuring and checking practices.

Describe methods for calibration.

Describe maintenance procedures for measuring and checking tools and equipment.

Number: **S0448**

Title: **WORKPLACE TECHNIQUES**

Duration: Total 63 hours Theory 24 hours Practical 39 hours

Prerequisites: Grade 12

Content:

S0448.1 Describe the use and application of hand, power, pneumatic, and hydraulic tools and equipment **(9 hrs)**
S0448.2 Select workpiece materials **(3 hrs)**
S0448.3 Perform benchworking procedures **(36 hrs)**
S0448.4 Fasten workpieces **(9 hrs)**
S0448.5 Describe procedures for maintaining a clean and organized working environment **(6 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
40%	60%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0448.0 Workplace Techniques

Duration: Total 63 hours Theory 24 hours Practical 39 hours

Cross Reference to Training Standards: 5570.03, 5570.07, 5071.04, 5571.07, 5571.08, 5571.09, 5571.10, 5571.15; 5572.01, 5572.02, 5572.03, 5572.04, 5572.05, 5572.06; 5572.07; 5570.08, 5570.09, 5570.12

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to describe the use and application of power, pneumatic, and hydraulic tools and equipment; perform benchworking procedures; verify workpiece materials; perform fastening procedures; and, describe shop environmental maintenance procedures.

LEARNING OUTCOMES AND CONTENT

48.1 Describe the use and application of hand, power, pneumatic, and hydraulic tools. **(9 hrs)**

Describe use and application of hand tools:

- safety legislation
- AAR regulations
- engineering drawings
- job documentation
- hammers
- wrenches
- sockets
- ratchets
- chisels
- drifts
- punches
- pinch bar
- screwdrivers
- files
- saws
- pliers
- pipe wrench
- steel banding tools
- assess tool condition
- maintenance procedures
- methods for calibration

48.1 Continued

Describe use and application of power tools:

- safety legislation
- AAR regulations
- engineering drawings
- job documentation
- grinders
- drills
- die grinders
- sanders
- saws
- assess tool condition
- calibration requirements
- attachments and tooling
- start-up and shut-down procedures
- tagging for further repair or maintenance

Describe use and application of pneumatic tools:

- safety legislation
- AAR regulations
- engineering drawings
- job documentation
- jacks
- grinders
- drills
- impact guns
- reamers
- drifts
- punches
- rams
- assess tool condition
- calibration requirements
- attachments and tooling
- tool limitations
  - leverage
  - weight ratios
  - capacity
  - tolerances
  - fluid power
  - clearances
  - stability
- tagging for further repair or maintenance

48.1 Continued

Describe the use and application of hydraulic tools.

- safety legislation
- AAR regulations
- engineering drawings
- job documentation
- jacks
- rams
- Enerpac™
- presses
- wrecking equipment
- rivet guns

Describe types of measuring devices required:

- leverage
- weight ratios
- capacity
- tolerances
- fluid power
- clearances
- stability

Demonstrate tagging procedures for further repair or maintenance.

48.2 Select workpiece materials. **(3 hrs)**

Select workpiece material:

- safety legislation
- AAR regulations
- engineering drawings
- job documentation
- dimensions of workpiece
- type of material
  - ferrous or non-ferrous materials
  - steel
  - alloys
  - aluminum
  - iron
- material testing practices
- hardness testing
- measuring and checking procedures
- checking and inspection devices
- material verification process
- work documentation

48.3 Perform benchworking procedures. **(36 hours)**

Chisel a workpiece:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- application
- tool maintenance
- chisel defects
  - burrs
  - mushroom head
- dress tool
- workholding device
- work documentation

Describe painting procedures:

- safety legislation
- AAR regulations
- protective clothing
- respiratory protectors
- environmental procedures
- job documentation
- painting equipment
- site preparation
- painting process
- stenciling
- decaling
- work documentation

48.3 Continued

Grind a workpiece:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- accessories and tooling
- grinding equipment
- grinding wheels
- inspection procedures
- dress wheels
- grinding wheel set-up
- workpiece set-up
- workholding device
- grinding procedures
- start-up procedures
- shut-down procedures
- tagging procedures
- checking and inspection devices
- verification process
- work documentation

Drill or ream holes:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- accessories
- workholding
- drilling machine
- cutting tools and accessories
- layout procedures
- trade calculations
- inspection procedures
- verification process
- checking and inspection devices
- drill bit sharpening
- drilling procedures
- reaming procedures
- start-up and shut-down procedures
- work documentation

48.3 Continued

Cut internal (ID) and external (OD) threads.

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- cutting tools and accessories
- layout procedures
- trade calculations
- internal threads
- external threads
- inspection procedures
- start-up and shut-down procedures
- checking and inspection devices
- verification process
- work documentation

48.4 Fasten workpieces. **(9 hrs)**

Select fasteners:

- safety legislation
- AAR regulations
- engineering drawings
- job documentation
- types of fasteners
  - nuts
  - bolts
  - rivets
  - screws
  - pins
  - clips
  - cotter keys
  - lock washers
- size of fastener
- grade of fastener
- nomenclature/terminology
- torque values
- tap drill sizes
- workpiece material requirements
- measuring and checking procedures

48.4 Continued

Perform fastening procedures:

- safety legislation
- AAR standards
- protective clothing
- protective equipment and gear
- job documentation
- types of fasteners
- hand and power tools
  - wrench
  - power tool
  - torque wrench
  - socket
- calibration techniques
- inspection procedures
- fluids
  - lubricating
  - locking
  - sealing
  - oils
  - Locktight™
  - Teflon™
- threaded fasteners
- locking techniques
  - tacking
  - chiseling
  - heating
  - peening
- checking and inspection devices
- verification process
- work documentation

48.5 Describe procedures for maintaining a clean and organized working environment. **(6 hrs)**

Describe personal hygiene practices for a shop environment

- safety legislation
- AAR regulations
- workplace safety policies
- protective clothing
- protective equipment and gear
- eye wash
- showers
- personal hygiene

48.5 Continued

Describe procedures for maintaining a clean and organized environment:
- safe work practices
- clean work area
- store tools and equipment

Describe procedures for inspecting equipment:
- working condition
- safety legislation
- AAR legislation
- job documentation
- defective components
- damaged components
- functions and operations of machine
- guards
- safety devices
- corrective actions

Identify steps for locking out and tagging mechanical equipment:
- job documentation
- lock-out procedures
- tagging procedures
- safety legislation
- AAR regulations

Number: **S0449**

Title: **Material Handling**

Duration: Total 18 hours Theory 12 hours Practical 6 hours

Prerequisites: Grade 12

Content:

S0449.1 Calculate forces and loads **(2 hrs)**
S0449.2 Describe procedures for the selection and inspection of rigging equipment **(1 hr)**
S0449.3 Describe procedures for positioning and attaching rigging **(1 hr)**
S0449.4 Describe inspection and preparation of hoisting and lifting equipment **(3 hrs)**
S0449.5 Describe worksite preparation procedures **(1 hr)**
S0449.6 Describe the operation of hoisting equipment **(3 hrs)**
S0449.7 Describe the use of scaffolds, lift platforms, and ladders **(2 hrs)**
S0449.8 Describe procedures for moving loads **(2 hrs)**
S0449.9 Describe procedures for setting down loads **(2 hrs)**
S0449.10 Describe procedures for shutting down and storing material handling equipment **(1 hr)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
66%	33%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0449.0 Material Handling

Duration: Total 18 hours Theory 12 hours Practical 6 hours

Cross Reference to Training Standards: 5570.14; 5573.01, 5573.02, 5573.03, 5573.04, 5573.05, 5573.06, 5573.07, 5573.08, 5573.09, 5573.10

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to calculate forces and loads; describe procedures for the selection, inspection, positioning and attaching of rigging; describe inspection and preparation of hoisting and lifting equipment; describe workplace preparation; describe the use of scaffolds, lift platforms, and ladders; describe procedures for moving and setting down the load; and, describe procedures for shutting down and storing material handling equipment.

LEARNING OUTCOMES AND CONTENT

49.1 Calculate forces and loads. **(2 hrs)**

Perform calculations to determine the forces and loads:

- job documentation
- safety legislation
- AAR regulations
- load weights
- allowable loads
- centre of gravity
- vertical forces
- horizontal forces
- distribution of loads
- sling patterns
- sling configurations
- load
- capacity
- capacity of material handling equipment
- capacity of rigging equipment

49.2 Describe procedures for the selection and inspection of rigging equipment. **(1 hr)**

Describe selection and inspection of rigging equipment:

- safety legislation
- AAR regulations
- job documentation
- rigging equipment
  - cable clamps
  - chain block hoists
  - chains
  - chokers
  - come-along
  - connectors
  - ropes
  - slings
  - tuggers
- pre-operational checks
  - damaged links
  - cracks
  - frayed cables
  - kinking
  - cuts in slings
  - threads on shackles
- repair procedures
- recommendation for further action
- tagging procedures

49.3 Describe procedures for positioning and attaching rigging. **(1 hr)**

Describe procedures for positioning and attaching rigging:

- safety legislation
- AAR regulations
- type and size of load
- job documentation
- hand signals
- positioning of rigging
- attaching rigging
- lifting capacity
- positioning of load

49.4 Describe inspection and preparation of hoisting and lifting equipment. **(3 hrs)**

Describe inspection and preparation procedures of hoisting and lifting equipment:

- safety legislation
- AAR regulations
- job documentation
- calculations
- lifting equipment
  - forklift
  - jib-crane
  - portable boom
  - overhead hoist
- pre-operational circle check
- equipment assessment process
- repair recommendations
- tagging procedures
- isolation procedures
- documentation of work

49.5 Describe worksite preparation procedures. **(1 hr)**

Describe procedures for preparing the worksite:

- safety legislation
- AAR regulations
- job documentation
- site inspection procedures
- worksite clearing procedures
- pathway clearing process
- pathway verification process
- tagging of pathways
- documentation of work

49.6 Describe the operation of hoisting equipment. **(3 hrs)**

Describe procedures for the operation of hoisting equipment:

- safety legislation
- AAR regulations
- job documentation
- hoisting equipment
  - forklift
  - jib-crane
  - portable boom
  - overhead hoist
  - chains
  - slings
  - hooks
- inspection procedures
- verification process
- lifting and moving procedures
- shut-down and start-up procedures
- lock-out procedures
- tagging procedures
- documentation of work

49.7 Describe the use of scaffolds, lift platforms, and ladders. **(2 hrs)**

Describe procedures for using scaffolds, lift platforms, and ladders:

- safety legislation
- AAR regulations
- job documentation
- visual inspection techniques
- defective equipment
- damaged equipment
- assembly procedures
- fall protection systems
- disassembly procedures
- tagging of equipment for further action
- documentation of work

49.8 Describe procedures for moving loads. **(2 hrs)**

Describe procedures for moving loads or workpiece:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- capacity of material handling equipment
- type and distance of move
- size of workpiece
- load control
- tag lines
- speed and travel
- turning and positioning load
- travel path/way
- load travel path/way
- operators keep to the back end of the load
- slinger guide keeps to the front to guide the load
- documentation of moving loads

49.9 Describe procedures for setting down loads. **(2 hrs)**

Describe procedures for setting down loads:

- safety legislation
- AAR regulations
- job documentation
- work or job site is clear
- supports placed and aligned
- lowering speed requirements
- stopping the set down before placing down the load
- sounding the alarm confirming "all clear" for down
- materials placed and located
- materials balanced
- materials aligned
- materials secured
- set down procedures
- documentation of setting down load

49.10 Describe procedures for shutting down and storing material handling equipment. **(1 hr)**

Describe procedures for shutting down and storing material handling equipment:

- safety legislation
- and AAR regulations
- job documentation
- shut down procedures
- inspection procedures
- damaged/defective components
- tagging for further action
- storage procedures
- lock-out procedures
- tagging procedures
- work documentation

Number: **S0450**

Title: **WELDING AND FABRICATION 1**

Duration: Total 33 hours Theory 9 hours Practical 24 hours

Prerequisites: Grade 12

Content:

S0450.1 Demonstrate procedures for using oxy-fuel and plasma-arc cutting equipment **(12 hrs)**

S0450.2 Demonstrate Shielded Metal Arc Welding (SMAW) **(12 hrs)**

S0450.3 Describe gas-fuelled welding equipment **(3 hrs)**

S0450.4 Describe procedures for operating emergency safety equipment when performing welding processes **(3 hrs)**

S0450.5 Describe procedures for handling hazardous material and dangerous goods/commodities when performing welding processes **(3 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
30%	70%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0450.0 Welding and Fabrication 1

Duration: Total 33 hours Theory 9 hours Practical 24 hours

Cross Reference to Training Standards: 5570.02, 5570.06, 5570.13; 5571.11, 5571.13, 5571.14

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to demonstrate procedures for using oxy-fuel and plasma-arc cutting equipment; demonstrate Shielded Metal Arc Welding (SMAW); describe gas-fuelled equipment; and, describe procedures for operating safety equipment and handling hazardous goods when performing welding processes.

LEARNING OUTCOMES AND CONTENT

50.1 Demonstrate procedures for using oxy-fuel and plasma-arc cutting equipment. **(12 hrs)**

Demonstrate procedures for using oxy-fuel and plasma-arc cutting equipment:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- engineering drawings
- job documentation
- pressures
- fuel gases
- tips
- gas distributors
- cable assemblies
- plasma gun liners
- assess equipment condition
- calibration requirements
- attachments
- tooling
- set-up methods
- tear down methods
- work documentation

50.2 Demonstrate Shielded Metal Arc Welding (SMAW). **(12 hrs)**

Demonstrate shielded metal arc welding:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- engineering drawings
- job documentation
- power source
- welding cable assemblies
- electrode holder
- electrode type and size
- assess equipment condition
- attachments
- tooling
- assembly of welding equipment
- setting up of welding equipment
- testing of welding equipment
- calibration
- work documentation

50.3 Describe gas-fuelled welding equipment. **(3 hrs)**

Describe gas-fuelled welding equipment:

- safety legislation
- AAR regulations
- protective clothing, equipment, and gear
- engineering drawings
- job documentation
- jacks
- compressors and generators
- equipment condition assessment
- calibration requirements
- attachments and tooling
- fuel levels
- set-up and tear-down of gas-fuelled equipment
- equipment limitations
  - leverage
  - weight ratios
  - capacity
  - tolerances
  - fluid power
  - clearances
  - stability

50.4 Describe procedures for operating emergency safety equipment when performing welding processes. **(3 hrs)**

Describe procedures for operating welding emergency safety equipment:

- type of emergency safety equipment
- safety legislation
- AAR regulations
- protective equipment and gear
- fire suppression equipment
- fire extinguishers
- respirators
- first aid equipment
- operational procedures
- work documentation

50.5 Describe procedures for handling hazardous material and dangerous goods/commodities when performing welding processes. **(3 hrs)**

Describe procedures for handling hazardous material and dangerous goods/commodities during welding processes:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- handling procedures
- storage procedures
- work documentation

Number: **S0451**

Title: **REGULATORY PUBLICATIONS 1**

Duration: Total 24 hours Theory 24 hours Practical 0 hours

Prerequisites: Grade 12

Content:

S0451.1 Interpret regulations and procedures from the Association of American Railroads Mechanical Section, Manual of Standards and Recommended Practices (MSRP) **(9 hrs)**

S0451.2 Interpret the general and permanent rules established by the Federal Register in the Code of Federal Regulations **(6 hrs)**

S0451.3 Interpret the regulations from the Association of American Railroads (AAR) Field Manual **(9 hrs)**

Evaluation & Testing:
Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
100%	0%	100%

Instructional/Delivery Strategies:
Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0451.0 Regulatory Publications 1

Duration: Total 24 hours Theory 24 hours Practical 0 hours

Cross Reference to Training Standards: U5570.0 > U5580.0

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice will be able to interpret regulations and procedures from the Association of American Railroads (AAR) Mechanical Section; rules established by the Federal Register in the Code of Federal Regulations; and, regulations from the AAR Field Manual.

LEARNING OUTCOMES AND CONTENT

51.1 Interpret regulations and procedures from the AAR Mechanical Section, Manual of Standards and Recommended Practices (MSRP). **(9 hrs)**

Identify key MSRP sections:
- scope and purpose
- specifications
- practices
- different sections
- relevant sections
- Section A Part I of MSRP

Distinguish between specifications, standards, and recommended practices:
- definitions
  - specification
  - standard
  - recommended practice
- identification code for specifications
- identification code for standards
- identification code for recommended practice
- definitions
  - past practices
  - alternate acceptable standards
  - effective dates
  - conditional approvals

51.1 Continued

Describe procedures for maintaining and updating of the MSRP:
- publication maintenance procedures
- update procedures

Identify AAR procedures for applying blue flag procedures.

51.2 Interpret the general and permanent rules established by the Federal Register in the Code of Federal Regulations. **(6 hrs)**

Identify terms and codes under the Federal Register in the Code of Federal Regulations.

Identify the purpose and scope of the Code of Federal Regulations:
- purpose of the regulations
- scope of the regulations
- regulations updating process

Identify key parts of the Code of Federal Regulations:
- key components
- applicable sections

51.3 Interpret the regulations from the Association of American Railroad (AAR) Field Manual. **(9 hrs)**

Describe the purpose and scope of the AAR Field Manual.

Identify the applicable categories and sections of the AAR Field Manual.

Interpret the application General Rules of the AAR Field Manual:
- general rules
- policies
- procedures
- compliance
- reinforcement

Describe the procedures for updating and maintaining the AAR Field Manual.

Identify specific areas of the AAR Field Manual:
- wear limits
- gauging procedures
- gauging limits
- welding specifications

Number: **S0452**

Title: **RAIL CAR BRAKES 1**

Duration: Total 24 hours Theory 15 hours Practical 9 hours

Prerequisites: Grade 12

Content:

S0452.1 Describe procedures for servicing and maintaining single-car brakes **(15 hrs)**

S0452.2 Describe procedures for performing a single-car brake test **(9 hrs)**

Evaluation & Testing:

Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
60%	40%	100%

Instructional/Delivery Strategies:

Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0452.0 Rail Car Brakes 1

Duration: Total 24 hours Theory 15 hours Practical 9 hours

Cross Reference to Training Standards: U5576

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice will be able to describe procedures for testing, maintaining, and servicing single-car brakes.

LEARNING OUTCOMES AND CONTENT

52.1 Describe procedures for servicing and maintaining single-car brakes. **(15 hrs)**

Describe procedures for servicing and maintaining single-car brakes:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- pre-test procedures
- single-car brake test
- checking and inspection devices
- brake rigging
- shoes
- hand brake
- bleed rods
- valves
- piping
- hoses
- slack adjusters
- reservoirs
- cylinders
- troubleshooting procedures
- recommended actions
- verification process
- work documentation

52.2 Describe procedures for performing a single-car brake test. **(9 hrs)**

Describe single-car brake test procedures.

- safety legislation
- AAR regulations
- job documentation
- pre-test inspection procedures
- SCTD (single car test device) daily test
- air-brake testing procedures
- work documentation

Number: **S0453**

Title: **RAIL CAR SAFETY APPLIANCES**

Duration: Total 9 hours Theory 9 hours Practical 0 hours

Prerequisites: Grade 12

Content:

S0453.1 Describe procedures for maintaining rail car hand rails and grabs **(3 hrs)**

S0453.2 Describe procedures for maintaining rail car ladders **(2 hrs)**

S0453.3 Describe procedures for maintaining rail car platforms **(2 hrs)**

S0453.4 Describe procedures for servicing and maintaining rail car sill steps **(2 hrs)**

Evaluation & Testing:

Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
100%	0%	100%

Instructional/Delivery Strategies:

Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
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Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0453.0 Rail Car Safety Appliances

Duration: Total 9 hours Theory 9 hours Practical 0 hours

Cross Reference to Training Standards: 5577.01, 5577.02, 5577.03, 5577.04

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice will be able to describe procedures for the servicing and maintaining of rail car hand rails, grabs, ladders, platforms, and sill steps.

LEARNING OUTCOMES AND CONTENT

53.1 Describe procedures for maintaining rail car hand rails and grabs. **(3 hrs)**

Describe maintenance procedures for rail car hand rails and grabs:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- inspection procedures
- troubleshooting
- defective components
- damaged components
- tools and equipment
  - gauges
  - measuring devices
  - torches
  - hammers
  - rivet guns
  - fasteners
  - chisels
- maintenance procedures
  - riveting
  - heating
  - straightening
  - fastening
  - peening
- verification process
- work documentation
- clean work area
- store tools and equipment

53.2 Describe procedures for maintaining rail car ladders. **(2 hrs)**

Describe maintenance of rail car ladders:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- ladders
  - rungs
  - brackets
  - stiles
- inspection procedures
- defective components
- damaged components
- troubleshooting
- tools and equipment
  - measuring devices
  - torches
  - hammers
  - rivet guns
  - fasteners
  - sockets
  - ratchets
  - pinch bars
- maintenance procedures
  - heating
  - splicing
  - straightening
  - riveting
  - fastening
  - peening
- replacement procedures
- verification process
- work documentation
- clean work area
- store tools and equipment

53.3 Describe procedures for maintaining rail car platforms. **(2 hrs)**

Describe rail car platform maintenance procedures:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- damaged components
- troubleshooting
- platform components
  - decks
  - frames
  - brackets
- tools and equipment
  - measuring devices
  - torches
  - hammers
  - rivet guns
  - fasteners
  - sockets
  - ratchets
- maintenance procedures
  - heating
  - straightening
  - fastening
  - riveting
  - welding
  - peening
- replacement procedures
- verification process
- work documentation
- clean work area
- store tools and equipment

53.4 Describe procedures for maintaining rail car sill steps. **(2 hrs)**

Describe procedures for maintaining rail car sill steps:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- damaged components
- troubleshooting
- sill step components
  - support brackets
  - steps
  - treads
- tools and equipment
  - measuring devices
  - torches
  - hammers
  - rivet guns
  - fasteners
  - paint equipment
- maintenance procedures
  - heating
  - straightening
  - fastening
  - riveting
  - peening
- replacements procedures
- verification process
- work documentation
- clean work area
- store tools and equipment